

## ABSTRACT

Biomolecular complexes, hereinafter referred to as multimeric biopolymers which can be used as the foundation of chemical control systems capable of both sensing the presence of a target analyte and actuating some mechanical response. The biomolecular complexes are multimeric biopolymers comprising at least two monomeric units. The monomeric units are selected from the group consisting of full-length proteins, polypeptides, nucleic acid molecules, and peptide nucleic acids. At least one of the monomeric units binds to the target analyte. In one highly preferred embodiment the multimeric biopolymers of the present invention undergo a detectable conformational change in response to exposure to an analyte. The present invention also provides micromachined and nanomachined devices and systems which employ the multimeric biopolymers to sense the presence of a target analyte, to actuate a response to the presence of a target analyte, or to perform both functions.